

MicroVAX 2000 Troubleshooting

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About This Guide

This guide leads you through troubleshooting procedures, suggests corrective actions, and explains how to use the diagnostic programs in the MicroVAX 2000's read-only memory (ROM). More serious problems require the use of procedures in the *VAXstation 2000/MicroVAX 2000 Maintenance Guide*. To obtain this guide, see Appendix A, related documentation, in *MicroVAX 2000 Operation* and contact your sales representative.

Conventions

This document uses the following conventions:

Convention	Meaning
Note	Provides general information on the current topic.
>>>	Console prompt
Return	Text within a box identifies a key, such as the Return key.
Bold	Bold print identifies user input.
VSmsv_Res_Succ	Examples of commands or other text you enter on the keyboard are shown in monospace type.

Basic Troubleshooting

Use the troubleshooting table (Table 1) to help you pinpoint a problem. The table assumes that your MicroVAX 2000 has been installed according to the instructions in *MicroVAX 2000 Installation*.

If the problem with your system remains, call your service representative. Your sales representative will give you the name and telephone number of your service representative.

How to Use The Troubleshooting Table

To determine the point at which your system's problem occurs, follow these steps:

1. Power down all terminals and other peripherals such as a printer or modem.
2. Power down any expansion boxes.
3. Power down the MicroVAX 2000 system unit.

After you power down the system unit, wait at least 10 seconds, and then perform the following steps:

1. Power up the console terminal.
2. Power up any expansion boxes.
3. Power up the system unit.

Observe the results. Read the table and follow the advice in the corrective action column in order. Make notes of the system conditions when failures occur. Also note the results you obtain from tests and procedures.

Troubleshooting Table

Table 1 suggests corrective actions for certain system problems.

Information on diagnostic test messages follows this table.

Table 1 Basic Troubleshooting

Problem	Possible Cause	Corrective Action
Problems During Self-Tests		
No response when the on/off switch is turned on (switch is not lit).	System is not plugged in.	Set the on/off switch to O. Plug in the system. Set the on/off switch to 1.
	No power at the wall outlet.	Use a different wall outlet, or check the circuit breaker controlling power to the wall outlet.
	Power cable is incorrectly installed.	Set the on/off switch to 0. Check that the cable is fully seated in the socket. Set the on/off switch to 1.
The system has power (the on/off switch is lit), but no display appears on the console terminal.	Console terminal is turned off.	Turn on the console terminal.
	Console terminal is off-line.	Put the terminal on-line. Refer to the terminal documentation for instructions.
	Console terminal cable is not installed correctly.	Make sure the cable is installed properly at both ends.
	Console terminal set-up has not been done correctly.	Reread the section, <i>Install the Console Terminal</i> , in <i>MicroVAX 2000 Installation</i> .
	Baud rate setting of the system and the terminal do not match.	Set the terminal baud rate to match the system. The normal operating setting is 9600.
	Terminal is defective.	Refer to the terminal documentation for troubleshooting instructions.
The self-tests halted and an error message or error summary displays on the console terminal.	The system detected an error while running its self-tests.	Copy the last number of the error message or summary and call your Digital service representative.
The system loses power, but the on/off switch is lit.	Power supply failure.	Call your Digital service representative.

Table 1 (Cont.) Basic Troubleshooting

Problem	Possible Cause	Corrective Action
Software does not boot from the fixed-disk drive.	A problem exists with the fixed disk.	See The Fixed-Disk Verifier in this guide to run the fixed-disk verifier. See Self-Tests, Configuration, and the System Exerciser for instructions on these tests.
	The default boot device is set incorrectly.	See Changing the Default Boot Device in this guide to set the default boot device.
	The recovery action may be set to halt.	See Setting the Recovery Action.
	A problem exists with the software (if installed) on the fixed disk.	Refer to your software documentation for help.
Software does not boot from the diskette drive. or A diskette read or write error message is displayed.	No diskette is in the diskette drive.	Insert a diskette with bootable software. Use the instructions in the software documentation.
	The diskette was inserted incorrectly.	Check that the write-protect notch on the diskette is to your left when you insert the diskette, and that the label is up.
	The diskette is damaged or does not contain bootable software.	Try another diskette that contains bootable software.
The TK50 tape drive red light flashes rapidly.	The drive mechanism is faulty.	Press and release the load/unload button four times to clear the fault. If the condition persists, do not attempt to remove the tape cartridge or use the tape drive. Call a service representative.
The TK50 passes the power-up test, but does not operate.	No cartridge is in the drive, or the drive is not loaded.	Insert the cartridge and press the load/unload button.
The cartridge release handle does not lift.	The power-up display is still in progress.	Wait for the red light to go out and try again. If the problem persists, do not use the drive. Call for service.
The cartridge release handle does not lock.	The cartridge is not inserted properly.	Reinsert the cartridge. If the problem persists, call for service.

Table 1 (Cont.) Basic Troubleshooting

Problem	Possible Cause	Corrective Action
The tape does not load.	The load/unload button is in the unload position.	Put the load/unload button in the load position. Wait for the light to go out before removing the tape.

Power-up Error Messages

The MicroVAX 2000 displays important information during its power-up test sequence, as described in *MicroVAX 2000 Operation*. If the sequence displayed during power-up contains a question mark (?) or an asterisk (*), failures may exist in the system. Use Table 2 to identify the faulty device.

An * indicates that a ROM has been found for the option, but no test code exists.

A single question mark (?) indicates a "soft" error. A soft error is one that does not prevent normal operation of the system, and serves to report the status of the system. An example is:

```
? E 0040 0000.0005
```

A double question mark (??) indicates a "hard" error, that is, one that indicates a serious problem that may affect normal operation and use of some component of the MicroVAX 2000. An example is:

```
?? 7 00C0 0001.7004
```

Three common power-up error messages are:

1. Clock not set

```
? E 0040 0000.0005
```

This message indicates that the system clock has not been set. Setting the clock is part of the operating system software installation; see your operating system software documentation for instructions.

2. Low battery

```
? D 0050 0000.0005
```

This message indicates that the system battery's charge is low or completely discharged. Run the system for about 17 hours to fully recharge the battery.

3. No Ethernet cable

```
?? 1 0000 0000.7004
```

This message indicates that the Ethernet option module is present in the system, but no cable has been installed on the connector on the rear of the system unit. If the Ethernet option module is installed in your system, and you see this error message on your console terminal perform the following steps:

1. Make sure the ThinWire/ThickWire switch is in the ThinWire position.
2. Make sure the T-connector that comes with your hardware kit is installed in the ThinWire port on the back of the system unit.
3. Make sure that either two BNC terminators (also in the hardware kit) or a ThinWire cable and one terminator are connected to the tee connector. For more information, see *MicroVAX 2000 Installation*. If you do not want to connect your system to the Ethernet network, ignore the message.

Table 2 Power-up and Self-Test Display Identifiers

Test Identifier	Device
F	Base video
E	Time-of-year clock
D	Nonvolatile random-access memory (RAM)
C	Serial line controller
B	Memory
A	Memory-management unit
9	Floating point unit
8	Interval timer
7	Disk controller
6	Tape controller
5	Interrupt controller and Ethernet ID ROM
4	Communications options

Table 2 (Cont.) Power-up and Self-Test Display Identifiers

Test Identifier	Device
3	Reserved for later use
2	Reserved for later use
1	Optional Ethernet interconnect module

Some errors indicated by a ? may not indicate problems that need immediate servicing. If you see a ? on the power-up display, especially next to a 7 or 6 (disk and tape drive controllers), but operation of the system seems normal, continue to use the system. If you continue to see errors of this type during the power-up display, use the information in the rest of this guide to solve the problems. In particular, see The System Exerciser and The Fixed-Disk Verifier sections. If the system continues to display error information or fails to operate normally, call a service representative.

Self-Tests

The self-test diagnostic programs reside permanently in your MicroVAX 2000s read-only memory (ROM), as the other diagnostics do. You can run self-tests from the console terminal.

To test a device in your MicroVAX 2000, follow these steps:

1. Use Table 2 to find the number or letter that represents the device(s) you want to test.

NOTE

Read your software documentation for shutdown procedures before halting the system.

2. Put the MicroVAX 2000 in console mode by pressing the halt button on the rear of the system.
3. Type **TEST** followed by the appropriate number or letter, then press **Return**.

```
>>> TEST 7
```

If you want to test a consecutive series of devices, type **TEST** followed by the first and last numbers of the series, then press **Return**.


```
>>> TEST F 1
```

The system displays the number of each device as it is tested, followed by a series of periods (...).

If the self-test is successful, no ? or error message is displayed, and the console prompt >>> appears.

```
7...
>>>
```

If a device fails the self-test, a failure message is displayed before the console prompt >>> is returned.

```
7?...
84 FAIL
>>>
```

If a self-test results in a failure, run the configuration display.

Configuration Display

To run the configuration display, follow these steps:

NOTE

Read your software documentation for shutdown procedures before halting the system.

1. Put the MicroVAX 2000 in console mode by pressing the halt button on the rear of the system. (See *MicroVAX 2000 Operation* for information on the halt button.)
2. Type **TEST 50** at the console prompt >>>, then press **Return**. This displays the system configuration, as shown in Figure 1. The mnemonics for each device in the configuration are listed in Table 3. Error information in this display is valuable to your service representative. Record this information before calling for service.

Figure 1 Sample System Configuration With no Errors

```
>>> TEST 50
```

```
KA410-A V2.2
ID 08-00-2B-02-CF-A4 <----- THIS IS THE HARDWARE Ethernet ADDRESS
```

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```
CLK          0000.0001
NVR          0000.0001
DZ          0000.0001
000000001 000000001 000000001 000000001 000000001 000012A0
MEM          0002.0001
00200000
MM          0000.0001
FP          0000.0001
IT          0000.0001
? HDC       1730.0001
000000000 000000000 00000320
NI          0000.0001
>>>
```

Run the system exerciser to obtain additional error information.

The System Exerciser

Use the system exerciser when the MicroVAX 2000 has intermittent problems, or when you see errors associated with 7 or 6 in your power-up display or self-tests. The system exerciser takes up to 11 minutes to complete. To run the system exerciser, follow these steps:

NOTE

Read your software documentation for shutdown procedures before halting the system.

1. Put the MicroVAX 2000 in console mode by pressing the halt button on the rear of the system. (See Chapter 1 for information on the halt button.)
2. Type **TEST 0** at the console prompt **>>>**, then press **Return**.

A sample system exerciser display is shown in Figure 2, with elements of the display identified.

Figure 2 System Exerciser Sample Display

[illegible]

Single (?) and double question marks (??) indicate errors. Note the mnemonic associated with the ?. Table 3 gives the devices that correspond to each mnemonic. Record this information for your service representative.

The exerciser is complete when the console prompt `>>>` appears on the screen.

Table 3 System Exerciser Mnemonics

Mnemonics	Device
CLK	System clock
NVR	Nonvolatile RAM
DZ	Serial line controller
MEM	Memory
HDC	Disk controller
MM	Memory management
FP	Floating point
IT	Interval timer
TPC	Tape controller
NI	Optional Ethernet network interconnect module

Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt **>>>** and press **Return** to return to normal operation.

The Fixed-Disk Verifier

The fixed-disk verifier reports any faults in the fixed disks. The fixed-disk verifier can also be used to determine whether a fixed disk has been formatted, and to determine what kind of drives are contained in the system.

If you see a ? for the disk drive controller (mnemonic **HDC**) during power-up or while running the system exerciser, run the fixed-disk verifier.

The verifier takes 5 minutes to report any faults on an RD32 fixed-disk drive and 8 minutes to report any faults on an RD53 fixed-disk drive. The fixed-disk verifier does not destroy software or data on the disk.

To run the fixed-disk verifier, follow these steps:

NOTE

Read your software documentation for shutdown procedures before halting the system.

1. Put the MicroVAX 2000 in console mode by pressing the halt button on the rear of the system unit.
2. Type **TEST 71** at the console prompt **>>>**, then press **Return**.

The following text is displayed:

```
VSmsv_QUE_unitno (0-1)?
```

3. Type 0 to verify a fixed-disk drive in the system unit or 1 to verify a fixed disk in the expansion box, then press **Return**.

The following text is displayed:

```
VSmsv_STS_Siz ..... RDxx      [xx REPRESENTS 32 OR 53, DEPENDING
                                ON THE TYPE OF FIXED-DISK DRIVE.]
```

```
VSmsv_QUE_RUsure (DUAx 1/0) ?  [x REPRESENTS THE NUMBER
                                CHOSEN, 0 OR 1.]
```

If the disk has not been formatted or there is a problem with the disk, the following text appears:

```
VSmsv_STS_Siz ..... ??
VSmsv_RES_Err #2
84 FAIL
>>>
```

If you see this text, and you want to format your disk, format it according to the instructions in *MicroVAX 2000 Operation*. If the disk is faulty, the formatter program will not be able to complete the formatting procedure. If this happens, call your service representative.

4. Type 1 and press **Return** if you want the verifier to continue. To stop the verifier, type anything other than 1. The verifier stops, an error message is displayed, and the console prompt >>> is returned. You may start over with the TEST 71 command or any other command.

The following sample text is displayed after you type 1:

```
VSmsv_STS_RDing .....OK
VSmsv_STS_OBBcnt = 14
VSmsv_STS_NBBcnt = 0
VSmsv_RES_Succ
>>>
```

This text verifies that the disk is in good operating condition. However, if you see the following text, the fixed disk is faulty and may need repair or replacement.

```
VSmsv_STS_NBBcnt = x [WHERE x INDICATES ANY NUMBER
                     HIGHER THAN 50]
```

Call your service representative.

5. Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt `>>>` and press **Return** to return to normal operation.

Setting the Default Recovery Action

During manufacture, your system is set to automatically start up the operating system software every time you power up, or in the event of an operating system software crash.

To change this recovery action setting, follow these steps:

NOTE

Check your software documentation for shutdown procedures before halting your system.

1. Put the MicroVAX 2000 in console mode by pressing the halt button on the rear of the system.
2. At the console prompt `>>>` type **TEST 53**, then press **Return**.

If the system is already set to reboot automatically, the following is displayed:

```
2 ? >>>
```

3. Press **Return** at the console prompt `>>>` if you want to retain this setting.

If 3 is displayed instead of 2, your system is set to halt automatically after every power-up. If you want to change from automatic halt to automatic reboot, type **2** at the console prompt `>>>` and press **Return**. If you want the system to automatically restart whenever the system goes down, type **1** at the console prompt `>>>` and press **Return**.

4. If you want your system to halt after every power-up, type **3** at the console prompt `>>>` and press **Return**.

In this case, your system will display the console prompt `>>>` after every power-up sequence, and you must type **BOOT** (or **BOOT** followed by the device name of the device containing operating system software) every time you power up.

For more information on setting the default recovery action, see the *VAXstation 2000/MicroVAX 2000 Maintenance Guide*.

Changing the Default Boot Device

The boot default device should be set during installation of the MicroVAX 2000, when the installer determines where the operating system software resides. The MicroVAX 2000 then boots from that device at power up, provided that the default recovery action is set to BOOT. (See Setting the Default Recovery Action for more information.) The operating system software can reside in one of the following places:

- a fixed disk in the system unit
- a fixed disk in the expansion box
- a remote system that you access through the Ethernet

Table 4 shows the name of each default boot device.

Table 4 Default Boot Device Names

Device and Location	Device Name
Fixed disk in system unit	DUA0
Fixed disk in expansion box	DUA1
Remote system accessed by Ethernet	ESA0
Diskette drive in system unit	DUA2
Tape drive in expansion box	MUA0

Devices DUA2 and MUA0, although valid default boot devices, do not have enough storage capacity to contain most operating system software.

To change the default boot device, follow these steps.

NOTE

Check your software documentation for shutdown procedures before halting your system.

1. Put the MicroVAX 2000 in console mode by pressing the halt button on the rear of the system.
2. At the console prompt > > > type TEST 51, then press Return.
3. If no boot device has been previously selected, the following is displayed:

```
.... ? >>>
```


Type the default boot device name you want, then press **Return**.

If a boot device has previously been chosen, that device is displayed as follows (DUA0 is a sample):

```
DUA0 ? >>>
```

To change the default boot device, enter the name of the device you want, followed by **Return**. If you do not want to change default boot device, type **Return**. To change the default back to no device, type a period (.) at the console prompt >>>. At subsequent power-ups, the MicroVAX 2000 will attempt to boot each device in the system in turn.

4. Type **BOOT** (or **BOOT** followed by the name of the device that contains operating system software) at the console prompt >>> and press **Return** to return to normal operation.

For more information on setting the default boot device, see the *VAXstation 2000/MicroVAX 2000 Maintenance Guide*.

Restarting the System After Running Tests

While you are running any of the tests or procedures in this chapter, you are in console mode. To resume normal operation of the MicroVAX 2000 you must reenter program mode. There are two ways to do this.

- Type **BOOT** at the console prompt >>>, then press **Return**. The system then searches each device in turn for operating system software.
- Type **BOOT** followed by a space and the device name of the device that contains operating system software, and then press **Return**, as shown in this example.

```
>>> BOOT DUA0
```

This enables the system to boot the operating system software immediately, without searching.

See your software documentation and the *VAXstation 2000/MicroVAX 2000 Maintenance Guide* for more information.

Summary of TEST Commands

A list of all TEST commands and the tests or utility programs they execute are shown in Table 5.

Table 5 Summary of TEST Commands

Command	Test or Utility Program
TEST 0	System exerciser
TEST F-1	Self-tests of each device in the system. See Table 2.
TEST 50	Configuration
TEST 51	Sets default boot device
TEST 53	Sets default recovery action
TEST 70	Diskette and fixed-disk formatter
TEST 71	Fixed-disk verifier

Service Information

If you have followed the corrective actions listed in this chapter and you continue to have problems with your MicroVAX 2000, call your service representative.

Your sales representative will give you the name and telephone number of your service representative.

Before you call:

1. Make notes based on the troubleshooting chart at the beginning of this guide. This information helps your service representative know what state the system was in when the problem occurred.
2. Write down the serial and model numbers of your system. They are located on the back of the system unit.
3. Be prepared to read information from the screen and to type commands at the keyboard while you talk to your service representative on the telephone.

For a complete list of services available to Digital customers, see *MicroVAX 2000 Customer Services* in your hardware information kit.

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	Excellent	Good	Fair	Poor	Unacceptable
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MicroVAX 2000

Technical Information

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About This Guide

This guide summarizes technical information about the MicroVAX 2000 system. The guide is divided into two sections. The first section describes the base system specifications. The second section describes specifications for optional components available for the MicroVAX 2000 system.

Base System Specifications

The MicroVAX 2000 is a multiuser, desktop computer that uses the MicroVAX II processor chip with two megabytes (Mbytes) of memory on-board. The system enclosure holds one or two mass storage devices.

The following tables list the system dimensions, electrical requirements, and environmental requirements.

Table 1 System Dimensions

System Unit

Width	33 cm (12.75 in)
Depth	29 cm (11.25 in)
Height	18.4 cm (7.25 in)
Weight	13.6 kg (30 lb)

Expansion Box

Width	33 cm (12.75 in)
Depth	29 cm (11.25 in)
Height	14 cm (5.5 in)
Weight	12.7 kg (28 lb)

Table 2 System Electrical Requirements

Input	115 VAC	230 VAC
Voltage tolerance	88 to 132 Vrms	176 to 264 Vrms
Power source phasing	single	single
Frequency	60 Hz	50 Hz
Line frequency tolerance	47 to 63 Hz	47 to 63 Hz
Power consumption (maximum)	160 W	160 W

Table 3 System Environmental Requirements

	Operating	Nonoperating	Storage
Maximum altitude	2400 m at 36°C	4900 m	2400 m
Temperature range	10°C to 40°C	-40°C to 66°C	5°C to 50°C
Temperature change rate	11°C/hr maximum	-	-
Maximum wet bulb temperature	28°C	28°C	32°C
Relative humidity	10 to 90% (non-condensing, no diskette) 20 to 80% (diskette in use)	95% at 66°C (may condense)	10 to 95% (non-condensing)
Minimum dew point	2°C	2°C	2°C
Heat dissipation	155 W maximum	-	-

Option Specifications

This section describes the options currently available for the MicroVAX 2000. Some of the options described in this section are already installed. If you want to add other options to your system, your Digital sales representative can advise you.

Descriptions of options in this section are grouped as follows:

- Mass storage options
- Communications controllers
- Printer options and their interfaces

Table 4 RD32 Fixed-Disk Drive

Storage capacity	41,820 Kbytes
Average seek time	40 ms
Data bit rate	5.0 Mbits/s
Rotation speed	3600 rpm
Cylinders	820
Heads	6
Height	4.3 cm (1.7 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8.0 in)
Weight	1.31 kg (2.9 lb)

Table 5 RD53 Fixed-Disk Drive

Storage capacity	69,632 Kbytes
Average seek time	30 ms
Data bit rate	5.0 Mbits/s
Rotation speed	3600 rpm
Cylinders	1024
Heads	8
Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8.0 in)
Weight	3.18 kg (7.0 lb)

Table 6 RD54 Fixed-Disk Drive

Storage capacity	155,677 Kbytes
Average seek time	30 ms
Data bit rate	5.0 Mbits/s
Rotation speed	3600 rpm
Cylinders	1221
Heads	15
Height	8.25 cm (3.25 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8.0 in)
Weight	3.18 kg (7.0 lb)

Table 7 RX33 Diskette Drive

Number of tracks	80
Number of heads	2
Track density	96 tracks/in
Track step rate	3 ms/track
Diskette size	13.13 cm (5.25 in)
Diskettes/diskette drive	1
Data capacity	1200 Kbytes (RX33K) 400 Kbytes (RX50K)
Recording surfaces/diskette	2 (RX33K) 1 (RX50K)
MFM data bit rate	500 kHz (RX33K) 250 kHz (RX50K)
Rotation speed	360 rpm (RX33K) 300 rpm (RX50K)

Table 7 (Cont.) RX33 Diskette Drive

512-byte sectors per track	15 (RX33K)
	10 (RX50K)
Height	4.3 cm (1.7 in)
Width	14.6 cm (5.75 in)
Depth	20.32 cm (8.0 in)
Weight	1.31 kg (2.9 lb)

Table 8 TK50 Tape Drive

Mode of operation	Streaming
Read/write method	Serpentine
Recording method	MFM
Recording medium	Magnetic tape
Tape width	1.2 cm (.5 in)
Tape length	185 m (600 ft)
Recording density	6667 bits/in
Number of tracks	22
Capacity	131.0 Mbytes (unformatted)
	94.5 Mbytes (formatted)
Tape speed	75 in/s
Tape start time	300 ms maximum

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MicroVAX 2000 Technical Information
EK-MVXAA-TM-001

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